



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,148	12/19/2001	Naofal Al-Dhahir	Al-Dhahir 2001-0207	8211
7590	03/29/2005		EXAMINER	
Henry T. Brendzel P.O. Box 574 Springfield, NJ 07081			BAYARD, EMMANUEL	
			ART UNIT	PAPER NUMBER
			2631	

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/026,148

Applicant(s)

AL-DHAHIR, NAOFAL

Examiner

Emmanuel Bayard

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-22 is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/19/01.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 5 is objected to because of the following informalities: in lines 6 and 14, before cyclic replace "a" with —the— and in line 10, before "cyclic" insert ---second---. Also in line 17, before "cyclic" replace "a" with —the second-- Applicant is suggested to amend this claim as to be consistent with the term "cyclic prefix". Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Dabak et al U.S. patent No 6,594,473 B1

As per claim 1, Dabak et al teaches a transmitter comprising: a plurality of m antennas (see fig.3 elements AT1-AT4 and col.8, lines 19-67), where m greater than one; and an encoder (see fig.4 element 44 or 46 and col.8, lines 20-67) handling m blocks of incoming symbols at a time, each block containing N of said incoming symbols, and encoding said N blocks of incoming symbols into m streams of symbols, each being applied to a different one of said m antennas, where said encoding involves

Art Unit: 2631

a modulator is the same as the claimed (modulo arithmetic) (see figs. 1 and 4 elements 18, 44M, 46M and col.8, lines 25-28).

As per claim 2, Dabak et al does teach where said encoding follows an orthogonal encoding design (see col.14, line 67).

As per claim 3, Dabak et al inherently teach where said encoding is FD-DC encoding.

As per claim 4, Dabak et al does teach where said encoding also involves negations and complex conjugations (see col.9, lines 1-4).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dabak et al U.S. patent No 6,594,473 B1 in view of Walton et al US Pub No 2002/0154705 A1.

As per claim 5, Dabak et al teaches all the features of the claimed invention except where in frame k said encoder generates $X_1(n)$, $N=0, 1, 2, \dots, N-1$ that is applied to a first one a stream of symbols of said antennas, preceded by a first cyclic prefix sequence of symbols $x(t)$, $t=-1, -2, \dots, -v$, where v equals to symbol memory of channel through which said transmitter communicates with a receiver, where the first cyclic prefix in the prefix sequence equals $x_{1k}(N-1)$ in the sequence is one where succeeding sequence, and $k=0, 1, 2, \dots, K-1$ that is applied to a second a stream of symbols,

Art Unit: 2631

one of said antennas, preceded by a second cyclic prefix sequence of symbols said encoder generates a stream of symbols that is equal x , that is applied to said first one of said antennas, preceded by a cyclic prefix sequence of and symbols stream of symbols x_{l+1} (/) that is equal to, that is a second applied to said second one of said antennas, preceded by the second cyclic prefix sequence of symbols.

Walton et al teaches a first one a stream of symbols of said antennas, preceded by a first cyclic prefix sequence of symbols and a second a stream of symbols, one of said antennas, preceded by a second cyclic prefix sequence of symbols (see fig.3 elements 322a 322b and page 9, paragraph [0015]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Walton into Dabak as to repeat portions of time-domain representation of the OFDM symbol to form the transmission symbol as taught by Walton (see page 9, paragraph [0015]).

Allowable Subject Matter

6. Claims 6-22 are allowed over the prior art of record.
7. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to anticipate or render obvious the following recited features: a frequency domain to time domain converter for converting the equalized signals Z_k and Z_{k+1} and a slicer responsive to said time domain as recited in claims 6 and 20.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Terry et al U.S. Patent No 6,614,861 B1 teaches a method and apparatus for higher dimensional.

Birru PUB no 2002/0037058 A1 teaches a frequency domain equalizer.

Struhsaker et al Pub No 2002/0086707 A1 teaches a wireless communication system.

Dagdeviren et al U.S. Patent No 6,519,291 B1 teaches a reduction of interference.

Hammons et al Pub No 2004/0146014 A1 teaches a method and construction for space-time codes.

Ling et al U.S. Patent No 6,771,706 B2 teaches a method and apparatus for utilizing channel.

Heikkila et al U.S. Patent No 6,700,926 B1 teaches a method and apparatus providing bit-to-symbol mapping.

Alamouni et al U.S. Patent No 6,853,688 B2 teaches a low complexity maximum.

Hammons et al U.S. Patent No 6,560,295 B1 teaches a method of generating space-time.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM)
Alternate Friday off.

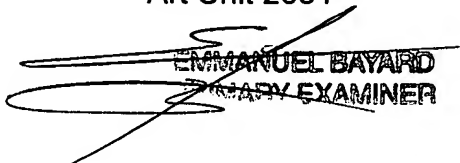
Art Unit: 2631

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Emmanuel Bayard
Primary Examiner
Art Unit 2631

3/23/05



EMMANUEL BAYARD
PRIMARY EXAMINER